IN THE CLAIMS:

Claim 1 (previously presented): A combustion method comprising steps of:

forming combustion air so as to have a jet flow cross section in an air throat, having a larger specific surface area than that in a case of supplying from a circular throat the same quantity of combustion air as said combustion air has;

injecting said combustion air into a furnace;

injecting fuel toward a jet flow of said air for causing a jet flow of said fuel to be rapidly mixed with said air jet flow with strong turbulence before losing velocity energy of said fuel jet flow;

wherein said combustion air is supplied after being preheated to have a high temperature close to a temperature of combustion exhaust gas by collecting heat of said combustion exhaust gas exhausted from a regenerative medium; and

wherein said combustion air whose quantity is less than a theoretical air quantity is supplied and high-temperature air combustion for forming a non-oxidizing atmosphere or a reduction atmosphere is carried out; and said fuel is injected with a ratio de/Dpcd of a corresponding diameter de of an opening (13a) of said air throat (13) and a gap ½ Dpcd from a center of said air throat to a center of said fuel nozzle (11) falling within a range of 0.1 to 0.5 and with a ratio La/de of said corresponding diameter de of said air throat relative to a distance La from an intersection of a fuel injection axis and a plane on a central axis in a longitudinal direction of said air throat to an outlet surface of said air throat falling within a range of 1.0 to 5.0.

Claim 2 (canceled).

Claim 3 (previously presented): A combustion method according to claim 1, wherein said combustion air is formed into a jet flow which is flat and has a thin radial thickness as a whole.

Claim 4 (previously presented): A combustion method according to claim 1, wherein said fuel is injected from at least two separate injection openings, caused to collide with an air jet flow having an increased specific surface area in a wide area, and rapidly mixed with said air jet flow with strong turbulences.

Claim 5 (previously presented): A combustion method according to claim 1, wherein a plurality of said fuel jet flows are formed, and said fuel jet flows collide with each other in the furnace before coming in contact with said air jet flow.

Claim 6 (previously presented): A combustion method according to claim 1, wherein a plurality of said air jet flows are formed, and said air jet flows collide with each other in the furnace before coming in contact with said fuel jet flow.

Claim 7 (previously presented): A combustion method according to claim 1, wherein a plurality of said fuel jet flows and said air jet flows are formed, and said air jet flows collide with each other and said fuel jet flows collide with each other in the furnace before said fuel jet flows collide with said air jet flows.

Claim 8 (previously presented): A combustion method according to claim 1, wherein a plurality of pairs of said fuel jet flows and said air jet flows which collide with each

other in said furnace are formed in order to form a large combustion field.

Claims 9-10 (canceled).

Claim 11 (previously presented): A burner comprising:

an air throat (13) for forming a combustion air so as to have a jet flow cross section having a larger specific surface area than that in a case of supplying from a circular throat the same quantity of combustion air as said combustion air has and for injecting a full quantity of said combustion air into a furnace; and

a fuel nozzle (11) for injecting fuel into said furnace so as to cause a jet flow of said fuel to collide with said air jet flow at a position away from an injection opening (13a) of said air throat by a specific distance before losing velocity energy of said fuel jet flow;

wherein said combustion air supplied from said air throat has a quantity which is less than a theoretical air quantity, and high-temperature air combustion for forming a non-oxidizing atmosphere or a reduction atmosphere is carried out; and said fuel being injected with a ratio de/Dpcd of a corresponding diameter de of said injection opening of said air throat and a gap ½ Dpcd from a center of said air throat to a center of said fuel nozzle falling within a range of 0.1 to 0.5 and with a ratio La/de of said corresponding diameter de of said air throat relative to a distance La from an intersection of a fuel injection axis and a plane on a central axis in a longitudinal direction of said air throat to an outlet surface of said air throat falling within a range of 1.0 to 5.0; and

wherein said air throat includes a regenerative medium (2) and flow switching means (3) for alternately leading combustion exhaust gas and combustion air to said regenerative medium, and injects into said furnace said combustion air preheated to have a high

temperature close to a combustion exhaust gas temperature through said regenerative medium.

Claim 12 (original): A burner according to claim 11, wherein said air throat has a flat rectangular opening.

Claim 13 (original): A burner according to claim 11, wherein said specific surface area can be increased by dividing said air throat into a plurality of small holes.

Claim 14 (original): A burner according to claim 11, wherein said air throat is divided into a plurality of small holes, and respective jet flows are continuously arranged in a form of a line without being independent to form a jet flow having a flat cross-sectional shape as a whole.

Claim 15 (previously presented): A burner according to claim 13, wherein a plurality of said small holes form a jet flow in which said air jet flows collide with each other before coming in contact with said fuel jet flow.

Claim 16 (previously presented): A burner according to claim 11, wherein said fuel nozzle has at least two injection openings and causes said fuel to collide with said air jet flow having an increased specific surface area in a wide area.

Claim 17 (previously presented): A burner according to claim 11, wherein said fuel nozzle has at least two injection openings and forms a jet flow in which fuel jet flows

injected from said respective injection openings collide with each other before coming in contact with said air jet flow.

Claim 18 (previously presented): A burner according to claim 11, wherein a plurality of said fuel nozzles are arranged so as to surround said air jet flow.

Claim 19 (original): A burner according to claim 18, wherein a plurality of said fuel nozzles form a jet flow in which said fuel jet flows collide with each other before coming in contact with said air jet flow.

Claim 20 (previously presented): A burner according to claim 11, wherein a plurality of said air jet flows and a plurality of said fuel jet flows are formed, and said air jet flows collide with each other and said fuel jet flows collide with each other before said air jet flows collide with said fuel jet flows.

Claim 21 (canceled).

Claim 22 (previously presented): A burner according to claim 11, wherein a ceramic honeycomb is included as said regenerative medium.

Claim 23 (previously presented): A burner according to claim 11, wherein said regenerative medium is included in said air throat, and said flow switching means is directly connected to a burner body constituting said air throat and switches said combustion air and said exhaust gas at a short distance from said regenerative medium.

Claims 24-27 (canceled).

Claim 28 (previously presented): A burner according to claim 11, a plurality of pairs of said air throats and said fuel nozzles are set to constitute a large combustion machine.

Claim 29 (previously presented): A burner comprising:

an air throat (13) for forming a combustion air so as to have a jet flow cross section having a larger specific surface area than that in a case of supplying from a circular throat the same quantity of combustion air as said combustion air has and for injecting a full quantity of said combustion air into a furnace; and

a fuel nozzle (11) for injecting fuel into said furnace so as to cause a jet flow of said fuel to collide with said air jet flow at a position away from an injection opening (13a) of said air throat by a specific distance before losing velocity energy of said fuel jet flow;

wherein said combustion air supplied from said air throat has a quantity which is not less than a theoretical air quantity, and high-temperature air combustion by turbulent diffusion mixing is provoked; and said fuel being injected with a ratio de/Dpcd of a corresponding diameter de of said injection opening of said air throat and a gap ½ Dpcd from a center of said air throat to a center of said fuel nozzle falling within a range of 0.1 to 0.5 and with a ratio La/de of said corresponding diameter de of said air throat relative to a distance La from an intersection of a fuel jet flow axis and a plane on a central axis in a longitudinal direction of said air throat to an outlet surface of said air throat falling within a range of 2.0 to 10.0; and

wherein said air throat includes a regenerative medium (2) and flow switching means (3) for alternately leading combustion exhaust gas and combustion air to said regenerative

medium, and injects into said furnace said combustion air preheated to have a high temperature close to a combustion exhaust gas temperature through said regenerative medium.

Claim 30 (previously presented): A burner according to claim 29, wherein said air throat has a flat rectangular opening.

Claim 31 (previously presented): A burner according to claim 29, wherein said specific surface area can be increased by dividing said air throat into a plurality of small holes.

Claim 32 (previously presented): A burner according to claim 29, wherein said air throat is divided into a plurality of small holes, and respective jet flows are continuously arranged in a form of a line without being independent to form a jet flow having a flat cross-sectional shape as a whole.

Claim 33 (currently amended): A burner according to claim [[32]] 31, wherein a plurality of said small holes form a jet flow in which said air jet flows collide with each other before coming in contact with said fuel jet flow.

Claim 34 (previously presented): A burner according to claim 29, wherein said fuel nozzle has at least two injection openings and causes said fuel to collide with said air jet flow having an increased specific surface area in a wide area.

Claim 35 (previously presented): A burner according to claim 29, wherein said fuel nozzle has at least two injection openings and forms a jet flow in which fuel jet flows injected from said respective injection openings collide with each other before coming in contact with said air jet flow.

Claim 36 (previously presented): A burner according to claim 29, wherein a plurality of said fuel nozzles are arranged so as to surround said air jet flow.

Claim 37 (previously presented): A burner according to claim 36, wherein a plurality of said fuel nozzles form a jet flow in which said fuel jet flows collide with each other before coming in contact with said air jet flow.

Claim 38 (previously presented): A burner according to claim 29, wherein a plurality of said air jet flows and a plurality of said fuel jet flows are formed, and said air jet flows collide with each other and said fuel jet flows collide with each other before said air jet flows collide with said fuel jet flows.

Claim 39 (previously presented): A burner according to claim 29, wherein a ceramic honeycomb is included as said regenerative medium.

Claim 40 (previously presented): A burner according to claim 29, wherein said regenerative medium is included in said air throat, and said flow switching means is directly connected to a burner body constituting said air throat and switches said combustion air and said exhaust gas at a short distance from said regenerative medium.

Claim 41 (previously presented): A burner according to claim 29, a plurality of pairs of said air throats and said fuel nozzles are set to constitute a large combustion machine.

Claim 42 (previously presented): A combustion method comprising steps of:

forming combustion air so as to have a jet flow cross section in an air throat, having a larger specific surface area than that in a case of supplying from a circular throat the same quantity of combustion air as said combustion air has;

injecting said combustion air into a furnace;

injecting fuel toward a jet flow of said air for causing a jet flow of said fuel to be rapidly mixed with said air jet flow with strong turbulence before losing velocity energy of ais fuel jet flow;

wherein said combustion air is supplied after being preheated to have a high temperature close to a temperature of combustion exhaust gas by collecting heat of said combustion exhaust gas exhausted from a regenerative medium; and

wherein said combustion air whose quantity is not less than a theoretical air quantity is supplied and high-temperature air combustion by turbulent diffusion mixing is provoked; and said fuel is injected with a ratio de/Dpcd of a corresponding diameter de of an opening (13a) of said air throat (13) and a gap ½ Dpcd from a center of said air throat to a center of said fuel nozzle (11) falling within a range of 0.1 to 0.5 and with a ratio La/de of said corresponding diameter de of said air throat relative to a distance La from an intersection of a fuel jet flow axis and a plane on a central axis in a longitudinal direction of said air throat to an outlet surface of said air throat falling within a range of 2.0 to 10.0.

Claim 43 (previously presented): A combustion method according to claim 42,

wherein said combustion air is formed into a jet flow which is flat and has a thin radial thickness as a whole.

Claim 44 (previously presented): A combustion method according to claim 42, wherein said fuel is injected from at least two separate injection openings, caused to collide with an air jet flow having an increased specific surface area in a wide area, and rapidly mixed with said air jet flow with strong turbulences.

Claim 45 (previously presented): A combustion method according to claim 42, wherein a plurality of said fuel jet flows are formed, and said fuel jet flows collide with each other in the furnace before coming in contact with said air jet flow.

Claim 46 (previously presented): A combustion method according to claim 42, wherein a plurality of said air jet flows are formed, and said air jet flows collide with each other in the furnace before coming in contact with said fuel jet flow.

Claim 47 (previously presented): A combustion method according to claim 42, wherein a plurality of said fuel jet flows and said air jet flows are formed, and said air jet flows collide with each other and said fuel jet flows collide with each other in the furnace before said fuel jet flows collide with said air jet flows.

Claim 48 (previously presented): A combustion method according to claim 42, wherein a plurality of pairs of said fuel jet flows and said air jet flows which collide with each other in said furnace are formed in order to form a large combustion field.